

SANYO

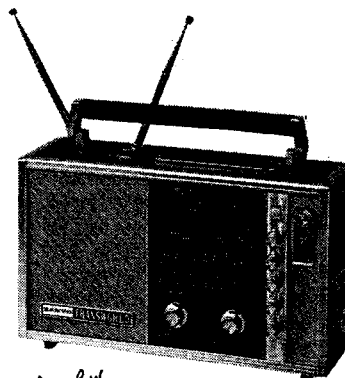
**18-transistor, 6-band
Portable Radio**

MODEL 18H-815

SERVICE MANUAL

SANYO ELECTRIC CO., LTD.

INTERNATIONAL DIVISION: SANYO ELECTRIC TRADING CO., LTD.
OSAKA, JAPAN



Transworld

SPECIFICATIONS

Frequency Range..... FM 87 - 108 MC
SW 1 2.3 - 7.3 MC
SW 2 8.0 - 22.0 MC
49m 5.95 - 7.3 MC
MW 520 - 1605 KC
LW 150 - 350 KC

Intermediate Frequency..... FM 10.7 MC
AM 455 KC

Transistors (1) 2SC668E FM RF Amplifier
(2) 2SC545C FM Local Oscillator
(3) 2SC668C FM Converter
(4) 2SC545E FM 1st IF Amplifier
(5) 2SC537 FM 2nd IF Amplifier
(6) 2SC537 FM 3rd IF Amplifier
(7) 2SA222 AM Converter
(8) 2SC537 AM Local Oscillator
(9) 2SC537E AM 1st IF Amplifier
(10) 2SC537 AM 2nd IF Amplifier
(11) 2SD187 Squelch Control
(12) 2SB303 Audio Amplifier
(13) 2SB186A Audio Amplifier
(14) 2SB186A Audio Amplifier
(15) 2SB187 Driver

(16) 2SB405R Power Amplifier
(17) 2SD72R Power Amplifier
(18) 2SC537Z Voltage Stabilizer
Diodes (1) 1S553 A.F.C.
(2) 1S188 FM Limiter
(3) 1S188 FM A.G.C.
(4) 1S188 Discriminator
(5) 1S188 Discriminator
(6) SIA3 AM Biasing
(7) 1S188 AM Detector
(8) SIA3 FM Oscillator Stabilizer
(9) SZ-8 Voltage Detector

Output Power Maximum 3,000 mW
Undistorted 2,000 mW
Power Supply 12 volts, 8×UM-1 (size "D" flashlight battery)
or AC adaptor (D12-815)
Current Drain No signal 30 mA
Maximum 420 mA
Speaker 5"×7" oval type permanent dynamic
4 ohm voice coil impedance
Cabinet Dimensions 15¼" (390mm) wide × 9½" (240mm) high
× 4¾" (240mm) deep
Net Weight 10 lbs. (4.5 kg)

ALIGNMENT PROCEDURES

AM ALIGNMENT

Sequence of Alignment	Wave Range	Dial Pointer	Signal Generator		Connection high side of Signal Generator	Coil Adjust-ment	Dial Pointer	Signal Generator		Trimmer Adjust-ment	Indication
			Fre-quency	Modula-tion				Fre-quency	Modula-tion		
I.F.T. T15	MW	1600KC	455KC	AM 30%	Thru. Loop Antenna						Max. Output
I.F.T. T14	MW	1600KC	455KC	AM 30%	"						"
I.F.T. T13	MW	1600KC	455KC	AM 30%	"						"
Oscillator LW	LW	160KC	160KC	AM 30%	"	T-12	320KC	320KC	AM 30%	Ct 8	"
Antenna LW	LW	160KC	160KC	AM 30%	"	L- 9	320KC	320KC	AM 30%	Ct 3	"
Oscillator MW	MW	600KC	600KC	AM 30%	"	T-11	1400KC	1400KC	AM 30%	Ct 9	"
Antenna MW	MW	600KC	600KC	AM 30%	"	L-11	1400KC	1400KC	AM 30%	Ct 4	"
Oscillator SW1	SW 1	2.5MC	2.5MC	AM 30%	"	T-10	6.5MC	6.5MC	AM 30%	Ct 10	"
Antenna SW1	SW 1	2.5MC	2.5MC	AM 30%	"	L-13	6.5MC	6.5MC	AM 30%	Ct 5	"
Oscillator SW2	SW 2	9.0MC	9.0MC	AM 30%	"	T- 9	20MC	20MC	AM 30%	Ct 11	"
Antenna SW2	SW 2	9.0MC	9.0MC	AM 30%	"	L-14	20MC	20MC	AM 30%	Ct 6	"
Oscillator 49m	49m	6.0MC	6.0MC	AM 30%	"	T- 8	6.2MC	6.2MC	AM 30%	Ct 12	"
Antenna 49m	49m	6.0MC	6.0MC	AM 30%	"	L-16	6.2MC	6.2MC	AM 30%	Ct 7	"

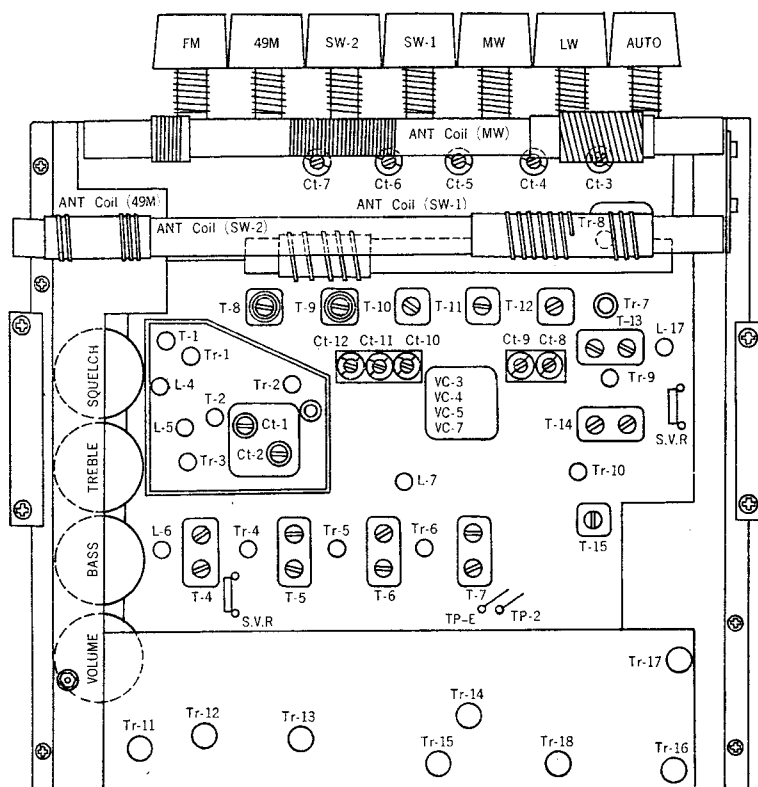
FM IF ALIGNMENT

Sequence of Alignment		Wave Range	Alignment Frequency	Testing Equipment Connection	Adjustment	Curve
1	T-6 (I.F.T.)	FM	10.7 MC	Connect sweep generator to test point TP-1 and oscilloscope to test point TP-2.	Detune T7 and tune T6 for max. gain and symmetry of response curve.	
2	T-5 (I.F.T.)	FM	10.7 MC	Same as above connection.	tune T-5 for max. gain and symmetry of response curve.	
3	T-4 (I.F.T.)	FM	10.7 MC	Same as above connection.	tune T-4 for max gain and symmetry of response curve.	
4	T-7 (I.F.T.)	FM	10.7 MC	Connect sweep generator to test point to TP-1 and oscilloscope to test point TP-3.	tune T-7 for symmetry and max. gain of response curve.	

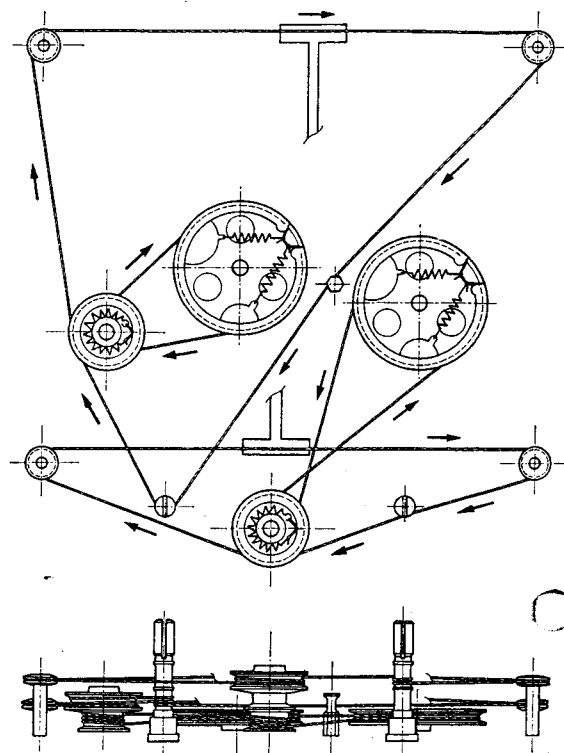
FM RF ALIGNMENT

Sequence of Alignment	Wave Range	Dial Pointer	Signal generator		Connect high side of Generator to	Coil Adjust-ment	Dial Pointer	Signal Generator		Trimmer Adjust-ment	Indicator
			Fre-quency	Modula-tion				Fre-quency	Modula-tion		
Oscillator	FM	87.0 MC	87.0 MC	22.5 KC	Signal generator to TP-1	T-3	104.0 MC	104.0 MC	22.5 KC	Ct-2	Max output
Antenna	FM	87.0 MC	87.0 MC	22.5 KC	Signal generator to TP-1	T-2	104.0 MC	104.0 MC	22.5 KC	Ct-1	Max output

LOCATION OF MAIN PARTS

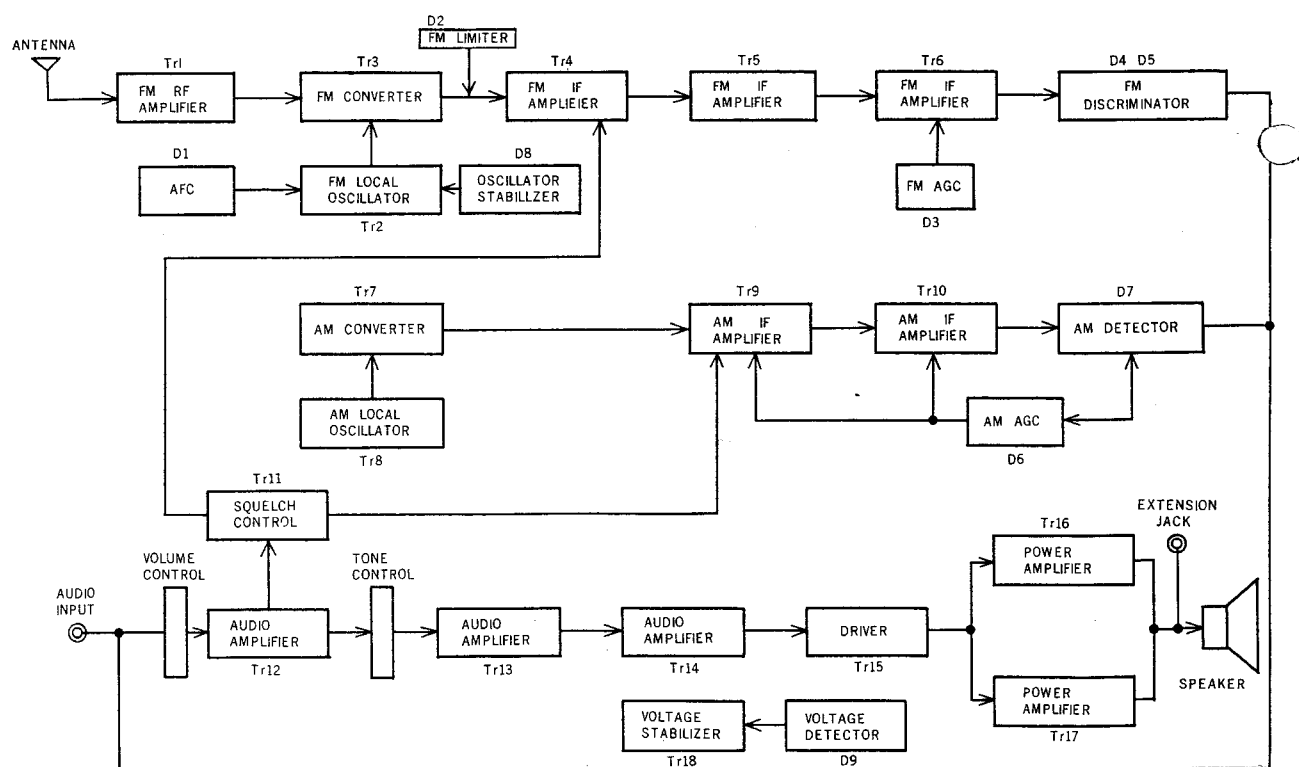


DIAL STRING

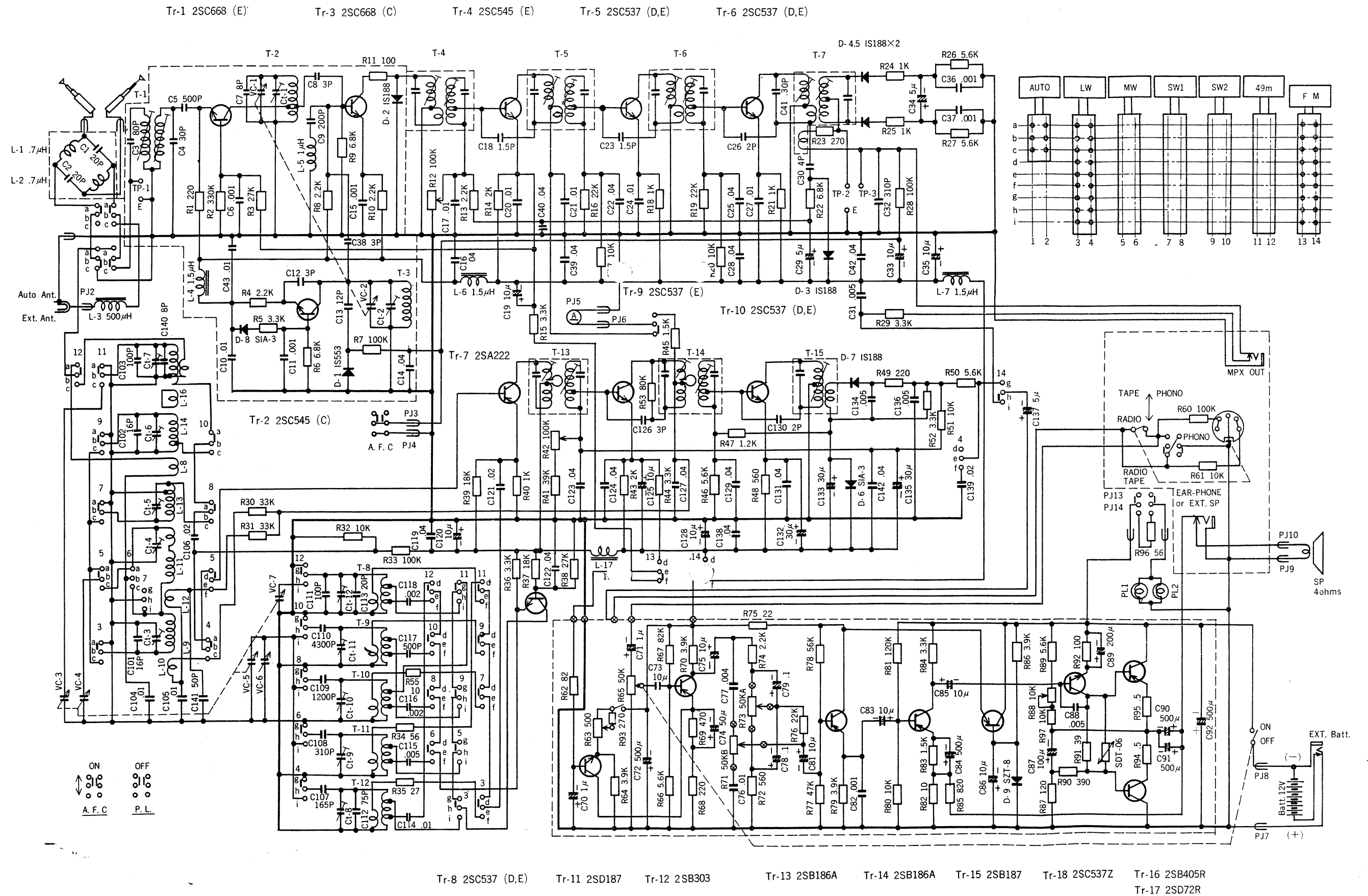


BLOCK DIAGRAM

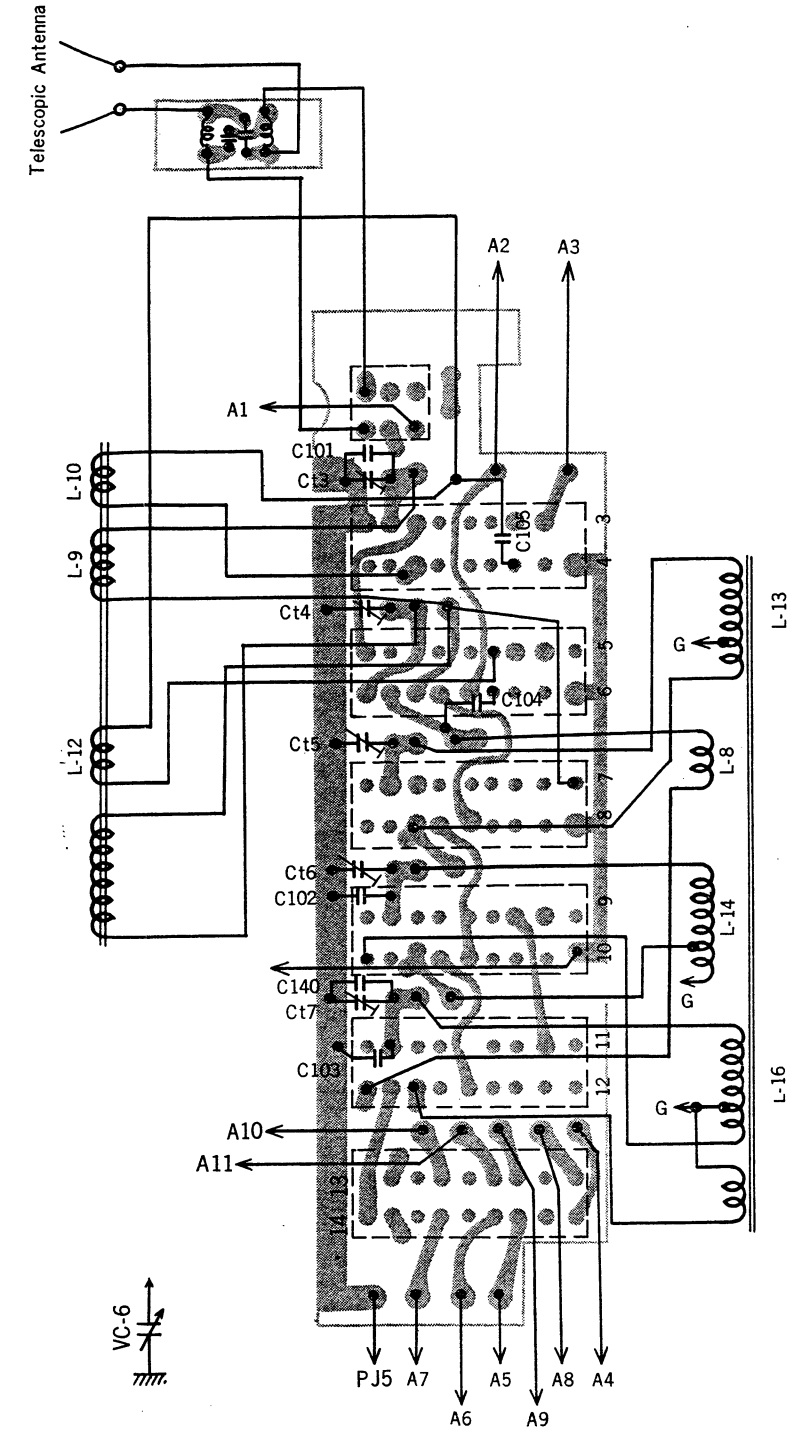
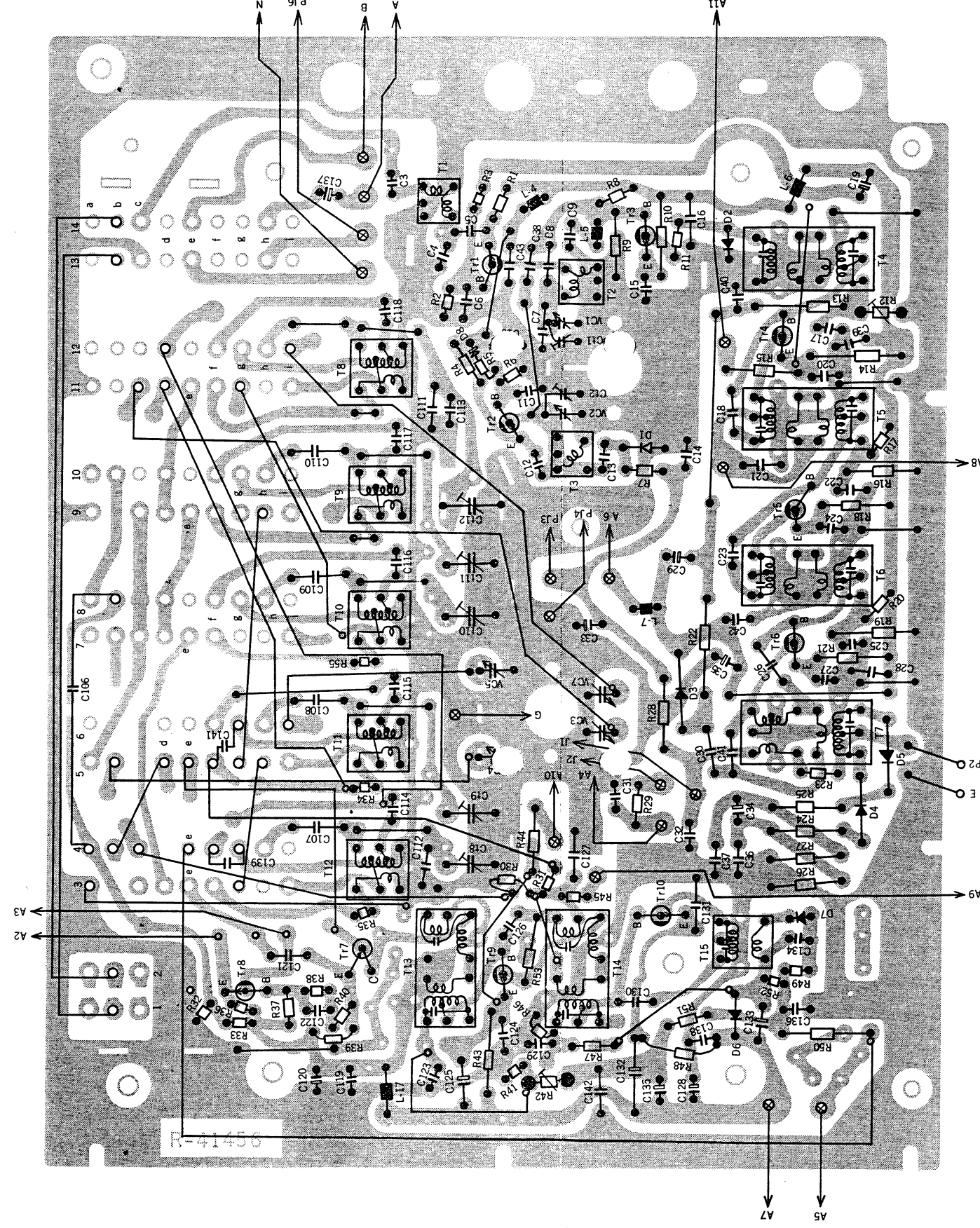
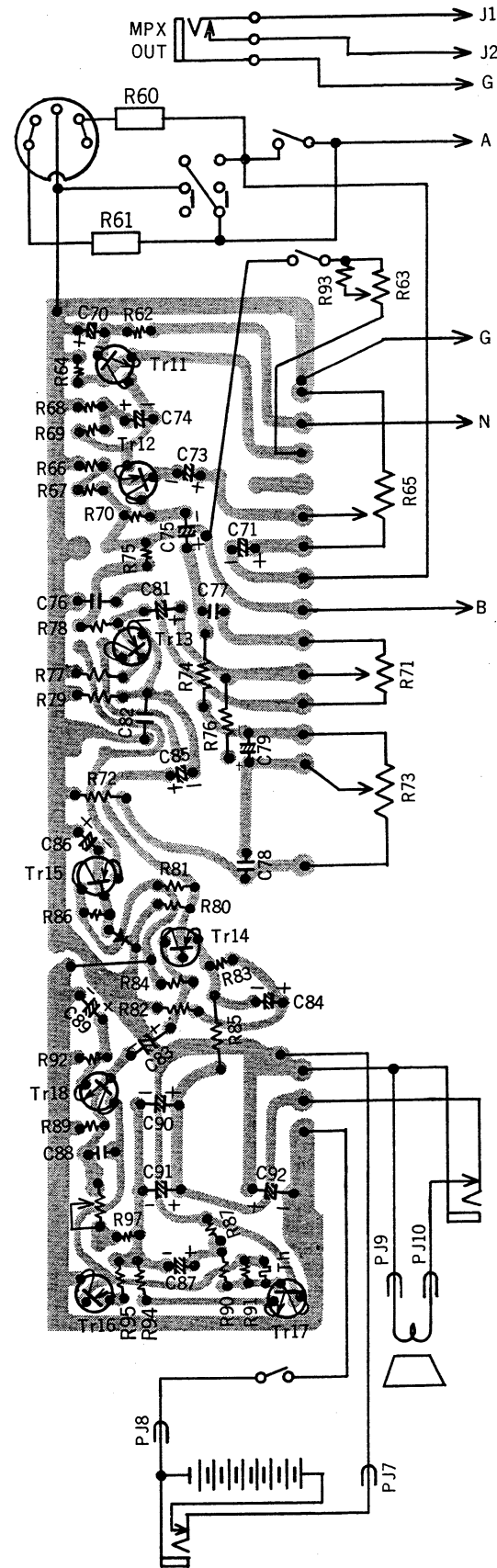
MODEL 18H-815 BLOCK DIAGRAM



SCHEMATIC DRAWING



CIRCUIT BOARD DIAGRAM



- ADJUSTMENT OF SEMI-FIXED RESISTORS**
- a) **R88 (10K ohms)**
Apply audio signals into first audio stage and observe the amplified waveform of them with oscilloscope. Adjust R88 for the operating point on which waveforms are clipped equally at both tops and bottoms of waves.
 - b) **R42 (100K ohms)**
Make the unit into MW reception and set the dial pointer at 1000KC. Adjust R42 for 400 μ A ($\pm 50\mu$ A) current circulation thru collector of Tr9 (2SC537E).
 - c) **R12 100K ohms**
Make the unit into FM reception and adjust R12 for 400 μ A current circulation thru collector of Tr4 (2SC545).

PARTS LIST

Part No.	Description	Q'ty
HOUSING		
* R-A18815	Housing Assembly	1
* R-424365	Housing - frame work	1
R-261206	Metal Grille - speaker grille	1
* R-27132	Badge - SANYO TRANSWORLD	1
R-12059	Speed Washer - badge mtg	2
R-261211a	Metal Grille - indicator side	1
R-261765	Trim Escutcheon - indicator	1
* R-31975	Dial Scale	1
R-261219a	Control Panel - control knobs identify	1
R-23867	Metal Ribbon - vertical column	3
R-113163	Metal Ribbon - horizontal	2
R-23865	Side Trim Metal - finished side mtg	2
R-32682a	Plastic Mount - AUTO ANT jack mtg	1
R-261574	Marking Metal - AUTO ANT	1
R-39263	Plastic Framing - band switch opening	1
R-32683	Plastic Framing - pilot switch opening	1
* R-261959	Specification Sheet	1
R-31964	Trimming - jacks on the back	1
R-31962	Lid - "	1
R-27132	Marking - "	1
R-32684	Slide Knob - AFC	1
R-S5530	Indicator - meter (400uA)	1
R-S4303	Slide Switch - AFC	1
R-S2155	Jack - AUTO ANT	1
R-S81101	Handle	1
R-28109	Metal Mount - handle mtg	2
R-35296	Plastic Washer - between Handle & Mtl Mnt	2
R-25263	Plate Spring - Metal Mount mtg	2
R-S81364	Push Button - LIGHT	1
R-S81660	Knob	5
R-S81099	Tuning Knob	2
R-S81197	Push Button - MW band select	1
R-S81202	Push Button - LW band select	1
R-S81198	Push Button - SW1 band select	1
R-S81199	Push Button - SW2 band select	1
R-S81200	Push Button - 49m band select	1
R-S81201	Push Button - FM band select	1
R-S81203	Push Button - AUTO operation	1
R-424312	Erphone Case	1
R-S81579	Pointor - AM	1
R-S81658	Pointor - FM	1

CHASSIS

* R-27128	Stud Nut - P.C. Board mtg	1
* R-34208	Plastic Mount -	1
R-113340	Back Screen	1
R-S81102	Tuning Shaft	2
R-32685	Composite Pulley - FM tuning drive	1
R-241158	Pulley Shaft - composite pulley	1
R-27055	Pulley - FM/AM	4
R-241016	Pulley Shaft - pulley above FM	2
R-241263	Pulley Shaft - pulley above AM	2
R-39310	Composite Pulley - AM tuning drive	1
R-241015	Pulley Shaft - composite pulley	1
R-S7089	Special Nut - tuning shaft mtg	2
R-39188	Drum	2
R-15116	Tension Spring - on dial cord	2
R-15113a	Tension Spring - on drum	2
R-15096a	Tension Spring - on composite pulley	2
R-44065	Cushion - tuning capacitor mtg	2
R-261608	Holder - AM antenna coil mtg	2
R-241157	Guide Shaft - AM dial cord	1
R-44291	Holder - pilot lamp mtg	2

TRANSISTORS AND DIODES

2SC668E	Transistor	Tr1
2SC545C	"	Tr2
2SC668C	"	Tr3
2SC545E	"	Tr4
2SC537	" (D or E)	Tr5 Tr6 Tr8 Tr10
2SC537E	"	Tr9
2SA222	"	Tr7
2SD187	" (red or yllw)	Tr11
2SB303	" (red or yllw)	Tr12
2SB186A	"	Tr13 Tr14
* 2SB187	" (red or violet)	Tr15
* 2SB405R	"	Tr16
* 2SD72R	"	Tr17 couple
2SC537Z	"	Tr18

Schematic Location	Part No.	Description
COILS AND TRANSFORMERS		
L14, L16	R-S81362	Antenna Coil - AM MW & LW
L11, L13	R-S81363	Antenna Coil - AM SW1 & 49m
L9	R-W2300	Antenna Coil - AM SW2
T12	R-W8219	Oscillator coil - AM LW
T11	R-W8220	" - AM MW
T10	R-W8221	" - AM SW1
T9	R-W8222	" - AM SW2
T8	R-W8223	" - AM 49m
T1	R-W2283	Antenna Coil - FM
T2	R-W4034	RF Coil - FM
T3	R-W8218	Oscillator Coil - FM
	R-W9021	VHF Coil 3 1/2 turns
L5	R-W1058	Choke Coil 1uH - 10.7MC trap
L4, L6, L7, L17	R-W1059	Choke Coil 1.5mH - line filter
L3	R-W1060	Choke Coil 500uH - auto antenna
T13	R-W5W022	IF Transformer - AM (yellow core)
T14	R-W5W023	" - AM (white core)
T15	R-W5T241	" - AM (black core)
T4	R-W5W024	IF Transformer - FM (brown core)
T5	R-W5W025	IF Transformer - FM (green core)
T6	R-W5W026	" - FM (blue core)
T7	R-W5W027	" - FM (red core)

CONTROLS

R65	R-R124190	Variable Resistor 50K D - volume control
R71	R-R124193	Variable Resistor 50K B - treble control
R73	R-R134192	Variable Resistor 50K A - bass control
R63	R-R124191	Variable Resistor 500K B - squelch
R12	R-R11011	Semi-fixed Resistor 100K
	R-C1116	Variable Capacitor - AM tuning capacitor
	R-C1098	Variable Capacitor - FM tuning capacitor
	R-C1151	Variable Capacitor - fine tuning control
	R-C0050a	Trimmer - AM antenna
	R-C0058	Trimmer - AM oscillator
	R-C0057	Trimmer - AM oscillator
R88	* R-R11013	Semi-fixed Resistor 10K

SWITCHES

	R-S4335a	Push Button Switch - band select
	R-S4208	Slide Switch - RADIO PHONO select
	R-S4381 or R-S4394	Push Switch - Pilot Light
	R-S4303	Slide Switch - AFC (cabinet assembly)

MISCELLANEOUS

SP	R-S6462	Speaker 5"x7" dia. 4 ohms 4W
	R-S6365	Earphone
PL1, PL2	R-S1287	Pilot Lamp 9V 30mA
	R-S1266b	Telescopic Antenna
	R-S8535a	Extension Antenna Lead w/ rubber cu,
	R-S81661	Battery Compartment
	R-S3179	Jack - TAPE PHONO input
	R-S2155	Jack - AUTO ANT. (cabinet assmby)
	R-261996	Heat Sink
	R-23781	Shielding - FM tuner
	R-S2139	Jack - EXT. SP
	R-S1155	Tip - jumper leads of telesc.
	R-25239a	Spring Wire - grounding of vari. cap.
	R-S3186	Terminal Strip
	R-35170	Battery Holder Tube - contains 3 cells
	R-35172	Battery Holder Tube - contains 2 cells

DIODES

D1	1S553	Diode (variable capacitance) - AFC D1
D2	1S188	Diode - FM limiter D2
D4, D5	1S188	" - FM Det. D4 D5
D3, D7	1S188	" - AM D3 D7
D6, D8	R-S1290	Diode S1A3 Biasing
D9	SZ-8	Zener Diode - Voltage Stabilizer
	SDT-06	Thermistor

PARTS LIST

Schematic Location	Part No.	Description
FIXED VALUE RESISTORS		
R1	R-R221J	220 ohms ± 5%
R2	R-R334J	330K ohms ± 5%
R3	R-R273J	27K ohms ± 5%
R4, R8, R10	R-R222J	2.2K ohms ± 5%
R5	R-R332J	3.3K ohms ± 5%
R6, R9	R-R682J	6.8K ohms ± 5%
R7, R28, R33, R60	R-R104K	100K ohms ± 10%
R11, R92	R-R101K	100 ohms ± 10%
R13, R74	R-R222K	2.2K ohms ± 10%
R14, R43	R-R202J	2K ohms ± 5%
R15, R29, R36, R44, R52	R-R332K	3.3K ohms ± 10%
R16, R19, R76	R-R223K	22K ohms ± 10%
R17, R20, R32	R-R103K	10K ohms ± 10%
R51, R61, R80	R-R103K	10K ohms ± 10%
R18, R21, R40	R-R102J	1K ohms ± 5%
R22	R-R682K	6.8K ohms ± 10%
R23, R93	R-R271K	270 ohms ± 10%
R24, R25	R-R102K	1K ohms ± 10%
R26, R27	R-R562J	5.6K ohms ± 5%
R30, R31	R-R333K	33K ohms ± 10%
R34, R96	R-R560K	56 ohms ± 10%
R35	R-R270K	27 ohms ± 10%
R37, R39	R-R183K	18K ohms ± 10%
R38	R-R273K	27K ohms ± 10%
R41	R-R393K	39K ohms ± 10%
R42		
R45	R-R152J	1.5K ohms ± 5%
R46, R50, R66	R-R562K	5.6K ohms ± 10%
R47	R-R122K	1.2K ohms ± 10%
R48, R72	R-R561K	560 ohms ± 10%
R49	R-R221K	220 ohms ± 10%
R53	R-R803J	80K ohms ± 5%
R55, R82	R-R100K	10 ohms ± 10%
R62	R-R820K	82 ohms ± 10%
R64	R-R392J	3.9K ohms ± 5%
R67	R-R823K	82K ohms ± 10%
R68	R-R221K	220 ohms ± 10%
R69	R-R471K	470 ohms ± 10%
R70, R79, R86	R-R392K	3.9K ohms ± 10%
R75	R-R220K	22 ohms ± 10%
R77	R-R473K	47K ohms ± 10%
R78	R-R563K	56K ohms ± 10%
R81	R-R124K	120K ohms ± 10%
R83	R-R152K	1.5K ohms ± 10%
R84	R-R332K	3.3K ohms ± 10%
R85	R-R821K	820 ohms ± 10%
R87	R-R121K	120 ohms ± 10%
R89	R-R562K	5.6K ohms ± 10%
R90	R-R391K	390 ohms ± 10%
R91	R-R390J	39 ohms ± 5%
R94, R95	R-RON5J	0.5 ohm ± 5%
R97	R-R103K	10K ohms ± 10%

FIXED VALUE CAPACITORS

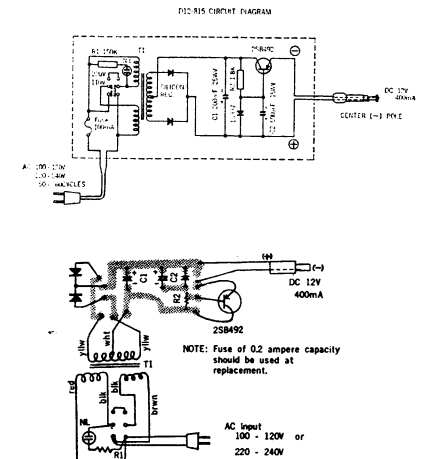
C1, C2, C113	R-CKD200K	Ceramic 20pF ±10%
C3	R-CKD800K	Ceramic 80pF ±10%
C4, C41	R-CKD300K	Ceramic 30pF ±10%
C5	R-CKD501M	Ceramic 500pF ±20%
C6, C11, C15	R-CKD102Z	Ceramic 0.001uF ±80%
C7, C140	R-CKD080J	Ceramic 8pF ±0.5pF
C8, C12, C38, C126	R-CKD030J	Ceramic 3pF ±0.25pF
C9	R-CKD201K	Ceramic 200pF ±10%
C10, C17, C20, C21, C24, C27, C43	R-CKD103Z	Ceramic 0.01uF ±80%
C14, C16, C22, C25, C28, C39, C40, C42, C119, C122, C123, C124, C127, C129, C131, C138, C142	R-CKD403Z	Ceramic 0.04uF ±80%
C13	R-CKD120K	Ceramic 12pF ±10%
C18, C23	R-CKD1N5	Ceramic 1.5pF ±0.25pF
C26, C130	R-CKD020	Ceramic 2pF ±0.25pF
C30	R-CKD040J	Ceramic 4pF ±0.25pF
C31, C115, C134, C136	R-CQS502M	Mylar 0.005uF ±20%
C32, C108	R-CQT311K	Styrol 310pF ±10%
C36, C37, C82	R-CQS102M	Mylar 0.001uF ±20%
C76, C104, C105, C114	R-CQS103M	Mylar 0.01uF ±20%
C77	R-CQS402M	Mylar 0.004uF ±20%
C88	R-CQS502M	Mylar 0.005uF ±20%
C103, C111	R-CKD101J	Ceramic 100pF ±5%
C107	R-CQT161K	Styrol 165pF ±10%
C109	R-CQT122K	Styrol 1200pF ±10%
C110	R-CQT432K	Styrol 4300pF ±10%
C106, C121, C139	R-CQS203M	Mylar 0.02uF ±20%
C112	R-CKD750J	Ceramic 75pF ±5%
C101, C102	R-CKD160K	Ceramic 16pF ±10%
C116, C118	R-CQS202M	Mylar 0.002uF ±20%
C117	R-CKD501K	Ceramic 500pF ±10%
C141	R-CKD500K	Ceramic 50pF ±10%

AC ADAPTOR (D12-815)

SPECIFICATIONS

AC Input Power Supply : 100-120V & 220-240V
DC Output : 12V 400mA
Dimensions : 4" wide x 2" high x 2 1/2" deep
Weight : 1.5 pound

CIRCUIT DIAGRAM



PARTS LIST

Part No.	Description
R-113348	Housing - top
R-113347	Housing - bottom
R-262002	Specification Sheet
R-41714	Printed Circuit Board
R-241521	Special Screw
R-113349	Metal Mount - transistor mtg
R-27112	Stud Nut
R-39423	Grommet - AC cord
R-44238	Cushion - DC cord
R-25159La	Spring - neon lamp mtg
R-S3134	AC Input Cord w/ US type plug
R-S8575b	Plug Adaptor - england type
R-S8574b	Plug Adaptor - german type
R-S1322①	DC Output Plug and Cord
R-W7127	Power Transformer
R-S1347	Silicone Rectifier (1S185D)
R-S1348	Zener Diode (1S337Y)
2SB492	Transistor
R-28085	Heat Sink - 2SB492
R-41370	Mylar Sheet - "
R-44223	Rubber Insulation - "
R-S1352	Fuse Holder
R-S1326	Fuse 0.2A
R-S4415	Slide Switch
R-S1341	Neon Lamp
R-39320	Plastic Mount - heat sink mtg
R-C9186	Electrolytic Capacitor 200µF 25V
R-C9165	Electrolytic Capacitor 500µF 15V

ELECTROLYTIC CAPACITORS (18H-815)

R-C9145	10µF 10V	C19, C33, C35, C73, C75, C81, C83, C85, C120, C125, C128
R-C9131	5µF 6V	C29, C34, C137
R-C9115	1µF 10V	C70, C71
R-C9162	500µF 10V	C72, C84, C90, C91
R-C9525	50µF 10V	C74
R-C9126	0.1µF 10V	C78, C79
R-C9145	10µF 10V	C86
R-C9136	100µF 6V	C87
R-C9143	200µF 6V	C89
R-C9127a	500µF 15V	C92
R-C9137	30µF 6V	C132, C133, C135